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GRADUATE PROGRAM IN HEALTH CARE ADMINISTRATION

**AMBULATORY DATA SYSTEM: A CASE STUDY IN  
THE COMPLAINT, UTILIZATION AND DATA ACCURACY OF THE  
AMBULATORY DATA SYSTEM AT NAVAL HOSPITAL,  
CAMP LEJEUNE, NORTH CAROLINA**

A GRADUATE MANAGEMENT PROJECT  
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Ambulatory Data System: A Case Study-NHCL  
**TABLE OF CONTENTS**

ACKNOWLEDGEMENTS.....	iii
ABSTRACT.....	iv
CHAPTER:	
1. INTRODUCTION.....	1
Background.....	5
Conditions Which Prompted the Study.....	9
Statement of Problem.....	13
Literature Review.....	14
Purpose.....	26
2: METHODS AND PROCEDURES .....	27
3: RESULTS .....	32
4: DISCUSSION/PROPOSITIONS.....	45
5: RECOMMENDATIONS .....	48
6: CONCLUSION.....	66
APPENDIX A.....	68
APPENDIX B .....	72
APPENDIX C .....	77
REFERENCES .....	79

Ambulatory Data System: A Case Study-NHCL  
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Ambulatory Data System: A Case Study-NHCL  
**ABSTRACT**

The recent shift toward managed care, coupled with the increase in the requirement for detailed health care information has made the requirement for the capture of relevant health care data a high priority. Health care information has significant importance to providers responsible for tracking and managing the care provided to their patients. At the same time, Medical Treatment Facility (MTF) commanders, lead agents, and other decision-makers need information to evaluate the cost, quality, and availability of this care. Subsequently, Naval Hospital Camp Lejeune (NHCL), like every other MTF, was tasked with the implementation and utilization of the ambulatory data system (ADS, 1998).

ADS can provide the opportunity to perform case mix analysis, evaluate clinic processes, obtain cost of patient- specific encounters, improve measures of outcomes and perform epidemiological trend assessments. Finally, ADS, in conjunction with process re-engineering efforts, may increase efficiency and productivity, further enhancing cost-containment, access to care, and the quality of health care services (ADS, 1998).

Unfortunately, NHCL ADS utilization and compliance have not been effective to date. It has been a frustrating experience, and many challenges preclude its success. To this end, the purpose of this descriptive study is to identify these challenges, identify propositions and recommend possible solutions.

## Ambulatory Data System: A Case Study-NHCL

Ambulatory Data System: A Case Study-NHCL  
**CHAPTER 1**

**Introduction**

*“We are entering a period of change-a shift from the command and control organization, to the information-based organization-the organization of knowledge  
.....it is the management challenge of the future”*

P. F. Drucker

With the advent of increasing health care expenditures, the graying of the American population, and the shift toward managed care, few organizations or individuals are unaffected by the changes sweeping the health care industry. As cost becomes the main driver of this shift, health care players, i.e., payers, employers, regulators, consumers and providers, are seeking ways to effectively manage costs while maintaining quality (Feldstein, 1994).

Health care costs are the fastest growing segment of government expenditures at the federal, state, and local level. The nation's total spending for health care is projected to increase from \$1.0 trillion in 1996, to \$2.1 trillion in 2007, averaging annual increases of 6.8 percent. (HCFA, 1998). Over this period, health spending as a share of gross domestic product (GDP) is estimated to increase from 13.6 percent to 16.6 percent. Contributing to these increasing health care dollars is a rising standard of living that allows the average household to expend more on health care, and an accelerated rate of price inflation for health care dollars compared to other segments of the economy. The Balanced Budget Act (BBA) of 1997 is expected to slow the growth in Medicare spending between 1998 and 2002 (HCFA, 1998).

As a nation, the U.S. leads the world in health care spending yet does not have the best overall health care outcomes (CBO, 1997). On average, U.S. employers spend 8.2 percent of their payroll on health insurance while their counterparts in Germany and Japan spend

Ambulatory Data System: A Case Study-NHCL

approximately 6.4 percent and 4.2 percent, respectively. Not only are governments and employers spending more on health care, so are patients (CBO, 1997).

As the trend toward cost management begins to dominate today's health care environment, health care organizations' current operations, key organizational structures, processes, and job performance expectations must be reorganized and reengineered (Doubloon and Bergheiser, 1996). The age of predominant inpatient utilization and fee for service based reimbursement is fading away, yielding to outpatient care, prevention, health and disease management, and cost capitation. In this arena, health care organizations must evolve into cost conscious, total quality health care entities. The key factor for success is to respond to this demand, meaning that health care organizations must change the way they do business (Doubloon et al, 1996).

In an attempt to control escalating costs, the nation's private and public third-party payers have turned to shared-risk strategies, including managed care plans. Managed care, the most rapidly growing of these approaches, can be characterized as a health care delivery system that integrates the financing and delivery of appropriate medical care by means of the following: 1) contracts with selected physicians and hospitals that furnish a comprehensive set of health care services to enrolled members, usually for a predetermined monthly premium; 2) utilization and quality controls that contracting providers agree to accept and financial incentives for patients to use the providers and facilities associated with the plan; and 3) the assumption of some financial risk by doctors, thus fundamentally altering their role from serving as agent for the patient's welfare to balancing patient need against the need for cost control (Kongstvedt, 1996).

In order to balance care and cost, many managed care organizations are pursuing wellness



Ambulatory Data System: A Case Study-NHCL and prevention programs, as well as disease management programs, to improve health outcomes. Managed care and other risk-sharing approaches to health care delivery are evolving into programs such as enrollment based capitation, where practitioners are paid to deliver primary care on a per member per month basis, and where they share hospital and specialty care costs with the managed care organizations. The feasibility of capitation depends on the use of data to predict health care costs based on outcomes (Fazen, 1994).

The growth in managed care has been explosive. In 1978, only 7.5 million people were enrolled in a health maintenance organization (HMO). By 1993, that figure had risen to an estimated 45 million. Data from 1995 indicate an increase to 50 million enrollees with projections for 1998 reaching 75 million. The number of managed care plans has also increased, from 188 in 1978 to over 800 in 1997 (GAO, 1996).

Despite the proliferation of managed care plans, data on their effectiveness in controlling costs have been mixed (GAO, 1996). Larger employers seem to benefit more than smaller companies from the managed care cost savings. Companies with 500 or more employees reported an average 1.9 percent decrease in benefit costs in 1995, while smaller employers saw their costs rise 6.5 percent (GAO, 1996).

The “graying of America” is a popular expression to describe the demographic shift facing the current and future age composition. The changing age distribution in the U.S. indicates that the over-65 population is increasing, with the over-85 group increasing the most rapidly. Life expectancy rates have increased as well due to changes in public health and medical technology. These figures are expected to continue to increase, and as the population ages, its need for health care also increases (CBO, 1997).

Compounding the “aging phenomenon” is the fact that women make up a greater proportion of the older age groups. At present, women constitute 51 percent of the U.S. population, yet they account for 60 percent of the population over age 65 and more than 70 percent of the population above age 85 (Inglehart, 1995). This data is significant because women face health problems that accompany old age such as osteoporosis, depression, and Alzheimer's disease in greater percentages than do men. Moreover, throughout their lives, women tend to suffer far more illness and chronic, debilitating conditions than men do. In fact, women's activities are limited by poor health approximately 25 percent more days each year than are men's activities, and women are bedridden 35 percent more days than men because of infectious diseases, respiratory problems, digestive disease, injuries, and other chronic conditions (Blumenthal, 1995).

Not only are Americans living longer, they are requiring more health care not covered by insurance plans. The Health Care Financing Administration (HCFA) reports that nursing home care costs were \$98.3 billion in 1995, up 12 percent over 1994. Medicare accounted for \$3.7 billion while Medicaid's portion was \$39.4 billion. Private, long-term care insurance contributed about \$800 million. That means that patients and their families paid the remainder, over \$54.4 billion (HCFA, 1998).

## **Background**

Health care organizations strive to deal with today's chaotic health care environment and all its new challenges, and so too must the Military Health Services System (MHSS). The MHSS

Ambulatory Data System: A Case Study-NHCL

is not exempt from fighting for survival in today's health care arena. On the contrary, the MHSS faces the identical challenges of increasing costs, an aging population and more informed health care consumers. Subsequently, the MHSS must reengineer its business practices in order to develop effective programs and policies designed to deliver the highest quality health care to the most beneficiaries for the lowest price. Additionally, the MHSS must meet this challenge in an environment wrought with steadily decreasing resources and an increasing beneficiary utilization (Starr, 1993).

The MHSS's response to the health care challenge is the development of a managed care plan designed to provide the required health care to its growing beneficiary population-TRICARE. The TRICARE program offers an increase in health care choices; furthermore, it assists in expanding access to care, assuring high quality care, controlling health care costs, and improving medical readiness (BUMED, 1997).

The key components of the TRICARE program include 1) the development of regional Navy, Army and Air Force Medical Centers as designated Lead Agents for the twelve TRICARE regions (BUMED, 1997). The designated Lead Agent has the ultimate responsibility for developing, in collaboration with regional MTF commanders, an integrated plan for the delivery of health care to beneficiaries residing within their respective regions (Deputy Secretary of Defense, 1995); and 2) the implementation of Managed Care Support Contracts (MCSC), which include contractual relationships for the development of networks of civilian health care providers (DoD, 1995).

As the MHSS continues to establish its managed care program, an essential factor in its ultimate success may lie in the capture of relevant health care information. This information, in

Ambulatory Data System: A Case Study-NHCL

the form of health care utilization data, allows MTF commanders, Lead Agents, and other decision makers to evaluate the cost-effectiveness of the health care being delivered within their areas of responsibility. The ability to compare health care data generated from key indicators under the control of the Lead Agents and local Commanders is essential to the MHSS corporate strategy. In order for the MHSS to remain competitive with local health care providers, it is essential that MTF Commanders have the ability to compare their data with local civilian health care entities. The data provide the MTF Commander the necessary elements required to make financially sound and justifiable "make-buy" decisions and to provide for eventual reimbursement scales between MTFs and Lead Agents. Additionally, properly queried health care data allow providers to track and manage the care provided to their patients (OASD-HA, 1995).

Currently, the civilian health care industry collects ambulatory health care data by using nationally recognized standard codes, i.e., International Classification of Diseases-9th Revision-Clinical Modification (ICD-9 CM) diagnostic codes and Current Procedural Terminology 4th Revision (CPT-4) codes (OASD-HA, 1995).

The Department of Defense (DoD) and the MHSS collects ambulatory data using the Medical Expense Performance Reporting System (MEPRS) methodology. The purpose of MEPRS is to provide for standardization and consistency in the accounting and reporting of DoD resources utilized. It is also the basis for uniform reporting of financial and operational performance data in the provision of health care delivery at fixed military medical facilities. Subsequently, this data is used by health care managers to make decisions regarding resource utilization within the facility (Lastrapps, 1994).

#### Ambulatory Data System: A Case Study-NHCL

The difficulty for data comparison lies in the fact that the MEPRS and CPT-4/ICD-9 CM data collection systems are not synonymous or interchangeable. This presents a significant problem for data comparison between the MHSS and civilian health care providers. In an effort to correct this data comparison inadequacy, in a memorandum to the Assistant Secretaries of the Military Departments, the Office of the Assistant Secretary of Defense, Health Affairs (OASD-HA) directed the MHSS to commence the collection of CPT and ICD ambulatory care data in Fiscal Year (FY) 95 (OASD-HA, 1995). This was a significant preparatory step in the process of collecting ambulatory encounter data within the MHSS for analysis and comparison with the civilian sector. Given the inception of this health care data collection, a data analysis process could be developed to facilitate bid price adjustments and modifications of the MCSCs (Lastrapps, 1994).

To further facilitate the collection of the necessary health care data in a workable, accurate form, in a 18 August 1995 memorandum, the OASD-HA mandated the implementation of an Ambulatory Data System (ADS) in Regions 1, 2, and 5 by April 1996. Based on Current Procedural Terminology (CPT) and International Classification of Diseases (ICD) codes, ADS automates the manual accumulation, analysis, and formatting of workload reports. Additionally, ADS expedites the collection of outpatient ambulatory data and provides the capability to produce workload and patient demographic reports (OASD-HA, 1995).

ADS's primary objective is to provide ambulatory data as a result of health care delivered within the MHSS. Each patient encounter is captured in sufficient detail to support basic clinical and administrative purposes, including analyses for managed care, epidemiological studies, billing, and severity/acuity case mix. In concert with Composite Health Care System (CHCS),

#### Ambulatory Data System: A Case Study-NHCL

ADS patient diagnostic and treatment data are incorporated into a single record readily accessible to all authorized users. Patient specific encounter data based on national coding systems are available for cost of care evaluations. This patient-level data provides the necessary detailed workload and “make-buy” information currently missing for the MHSS ambulatory area. When properly utilized, the ADS process can improve the reimbursement for third party collections. Additionally, providers no longer have to keep track of care they are providing for their Residency Review Committee's (RRC's) and credentialing requirements” (ADS, 1998).

Functionally, ADS is a form-based data collection tool similar to the "master bills" used in civilian health care practices. For the majority of patients, military providers need only to select appropriate diagnoses (Dx), procedures (i.e., treatments, often abbreviated "Tx"), and patient disposition from pre-coded ADS form lists that have been tailored by the providers to reflect the clinic's routine practice patterns. For every patient, an encounter form is printed out, including pertinent patient demographic information and a template of symptoms, diagnoses, and treatments. This ADS template is clinic-specific, meaning that the clinical staff can modify the template to reflect the type of health care routinely provided within their clinic. Not only can a template be edited, but also multiple templates can be created for different situations within a single clinic. The overlay sheet itself is similar to a scantron or "bubble" sheet. The provider fills in the circles next to the appropriate symptoms, diagnoses, etc. At the end of the encounter, the form is collected and scanned into the system with all other patient forms, updating each patient's medical record in ADS. In this manner, ambulatory patient care data is collected in just a few seconds (ADS, 1998).

Naval Hospital Camp Lejeune (NHCL), North Carolina serves as one of the MTFs within

Ambulatory Data System: A Case Study-NHCL  
TRICARE Region 2. A middle level medical facility within the MHSS, NHCL provides an extensive range of inpatient and outpatient medical services to active duty members and authorized beneficiaries. It is responsible for approximately 90,000 total MHSS beneficiaries in the Eastern North Carolina catchment area (Higgs, 1998).

During FY97, NHCL provided over 206,731 outpatient visits to eligible beneficiaries (Higgs, 1998). The accurate capture of ambulatory data by NMCP, utilizing the ADS, will provide a tremendous amount of useful health care information to those in OSD Health Affairs making decisions regarding the resourcing of the Naval Hospital and for the MTF Commanding Officer and staff in making local business decisions. The compliance of ADS will significantly impact health care management activities and clinical practices at NHCL, as well as other MTFs throughout Region 2.

### **Conditions Which Prompted the Study**

Individual health care providers, MTFs, and the Department of Defense (DoD) all require detailed, patient-level information on outpatient care provided by the MHSS. Until the development of ADS, all outpatient visits were given the same value, regardless of resource intensity, difficulty of diagnosis, or acuity of patient condition. If an MTF collected encounter data at all, the data was limited to those patients with health insurance other than Civilian Health and Medical Program of the Uniformed Services (CHAMPUS) or MEDICARE. Additionally,

Ambulatory Data System: A Case Study-NHCL

this data collection process was hindered by a lack of supporting systems and procedures (ADS, 1998).

As the MHSS continues its establishment of the TRICARE program, detailed ambulatory information will increase in importance to providers responsible for tracking and managing the care provided to their patients. At the same time, MTF commanders, lead agents, and other decision-makers need information to evaluate the cost, quality, and availability of this care. DoD medical facilities require ambulatory encounter data for many uses to include: 1) provider feedback and support (patient panels, profiling, etc.); 2) teaching program support (residency review committees and accreditation); 3) assessment of population epidemiology; 4) outcomes analysis; 5) managed care network decisions; 6) clinic management; 7) assessment of workload and patient complexity; and 8) resource allocation (ADS, 1998).

Additionally, the MTFs in Region 1, 2 and 5 will soon be faced with the advent of revised financing, bid-price-adjustments, and future managed care support contracts that may incorporate some or all of the revised financing philosophies/strategies. Therefore, it is imperative that each command understand the impact of ADS on their future resourcing (BUMED, 1997).

Under revised financing, MTF commanders in Regions 1, 2 and 5 will receive direct care dollars for MTF enrollees including funds that were previously spent under CHAMPUS for these same enrollees. Along with this funding, will come the full risk for any civilian care an MTF enrollee requires, with the exception of a catastrophic cap that will be held at the service level and determined for each MTF (generally represents 4-6 percent of the CHAMPUS funds) (BUMED, 1997).



#### Ambulatory Data System: A Case Study-NHCL

MTF's under revised financing are at risk for beneficiaries enrolled to the MTF. ADS is the tool that will align enrolled outpatient clinic visits to the MTF in the first option period of the contract if, and only if, this data has been captured in the data collection period. The data collection period is the 12-month period prior to the start work date for the contract. This means that if the contract start-work date is December 1998, then the data must be accurately collected and documented in the ADS starting December 1997 (BUMED, 1997).

ADS presents numerous possibilities as a management tool in each MTF; it is critical that commanders and their staff understand how this tool will be used in the Bid Price Adjustment (BPA). The BPA pertaining to the managed care contracts can result in either a favorable or unfavorable adjustment for the government at the Regional level. Each MTF's contribution to the "gain" or the "loss" share will be considered at the service level for reallocation. "Losses" can be incurred if MTFs appear to be shifting outpatient visits to the network. ADS becomes critical as it is used to measure outpatient clinic visits and as such, gives MTFs credit for work generated in house. If the data is not captured, it is assumed to be contractor outpatient workload (BUMED, 1997).

In light of the implementation of revised financing, BPA, and managed care contracting, proper utilization and compliance with the ADS at NHCL is critical to organizational success and offers the opportunity for significant organization-wide rewards and benefits. These include the ability to : 1) properly manage health care delivered in the catchment area, including the appropriateness of resource use, proper treatment patterns and case-mix analysis; 2) improve outcome measurement and perform epidemiological trend assessments; 3) capture accurate workload; 4) increase NHCL third party collections; 5) negotiate payment liability with respect to

Ambulatory Data System: A Case Study-NHCL  
BPAs, resource sharing, and other contracts and agreements; and 6) in conjunction with process re-engineering efforts, ADS may lead to an increase in efficiency and productivity, further enhancing cost-containment, access to care, and the quality of health care services available at NHCL.

Since the implementation of ADS in May 1996, Naval Hospital Camp Lejeune has had reoccurring difficulty taking advantage of ADS opportunities and, subsequently, has been unable to meet the minimum requirements established by the Navy Surgeon General. Through the Naval Medical Information Management Center (NMIMC) the Navy Surgeon General has imposed a monitoring device in the form of a metric that measures ADS compliance at each MTF. Specifically, this metric is the ratio of visits recorded on ADS divided by the number of visits scheduled in CHCS. The metric requires that each MTF have at least 90 percent compliance in each of their clinics and that their ADS workload be at least equal to their CHCS workload (ADS, 1998).

NHCL has consistently reported clinical compliance percentages ranging from 0% to 100% with an average of approximately 82% for FY97 and FY98 (Higgs, 1998). Additionally, through the Navy Surgeon General's ADS/CHCS comparison report, NHCL has been unable to capture accurate, timely ADS data and often the ADS workload is 40% of the workload indicated in CHCS (Higgs, 1998).

In addition to issues related to noncompliance and data inaccuracy, there are several other areas of concern regarding the NHCL ADS process, to include: 1) ADS network functionality; 2) absence of a well-advertised internal infrastructure to support ADS; 3) lack of command support, especially at the department head and provider levels; 4) fear of change; 5) apprehension in

Ambulatory Data System: A Case Study-NHCL reporting accurate information/data; 6) absence of clear ADS processes in some clinical areas; 7) lost opportunities in third party collections; 8) lack of required training at the “super-user” (the individual responsible for the day-to-day ADS data input) level; 9) lack of essential hardware, i.e., sufficient number of scanners; 10) impact of re-engineering i.e., downsizing; 11) power struggles; and 12) hidden political agendas

Each area of concern is present in each clinic in varying degrees. Consequently, the result of NHCL’s noncompliance and inaccurate data, if continued, can result in serious financial ramifications for the command in the areas of managed care contracts, BPAs, third party collections, and resource allocation. Based on unofficial estimates calculated using a cost estimate of \$292 per patient, which is the CHAMPUS allowable charge for a primary care outpatient visit under the Managed Care contract for this area, NHCL will have lost over \$6 million dollars due to inadequate ADS utilization and compliance (Higgs, 1998).

### **Statement of Problem**

ADS compliance and reporting accurate health care data presents a tremendous challenge to NHCL. The use of ADS represents a significant change in established business and clinical practices. Further, it is evident that multiple barriers and challenges to ADS full compliance are present throughout the organization. Varying groups of individuals throughout the organization have expressed apprehension regarding the usage, necessity, validity, and utility of ADS. Several medical providers have expressed concern that ADS will not provide benefits that will justify the burden of utilizing it. Nursing personnel are concerned that ADS will not accurately account for nursing time and care. The clerical personnel voice concern that the implementation of ADS will result in re-engineered processes that may change or eliminate positions. Finally, the majority of

Ambulatory Data System: A Case Study-NHCL  
hospital personnel feel that none of the data generated by ADS are used to make any decisions that effect NHCL. Furthermore, these individuals believe that ADS will be replaced by another Navy-wide data system and see no justification for expending the time necessary too fully implement ADS.

Each of the above factors constitutes the make-up of the NHCL ADS compliance dilemma. ADS is shifting to the principal health care information source by which many priority decisions are being made by higher authority. The decisions based on inaccurate and incomplete data will effect the future resourcing and ultimate success of NHCL. At the same time, NHCL as an organization views ADS as a burden to their routine clinical process and perceives no utility in its use. Steps must be taken to: 1) educate the organization regarding ADS benefits and the ramifications of poor ADS usage; 2) identify and implement proper ADS processes; 3) implement effective third party collection/ADS processes; 4) evaluate ADS system support, hardware, and network capabilities; 5) analyze and remove ADS barriers and challenges; 6) verify staffing with regard to ADS usage; and 6) make ADS a command priority.

### **Literature Review**

Information technologies are transforming the way health care is delivered. Innovations such as computer-based patient records, hospital information systems, computer-based decision support tools, community health information networks, telemedicine, and new ways of distributing health information to consumers are beginning to affect the cost, quality, and accessibility of health care (Dellecave, 1995).

The health care delivery system has several unique characteristics that discourage the spread of information technologies. Health professionals perform a wide variety of tasks

Ambulatory Data System: A Case Study-NHCL including rapidly changing combinations of "hands-on" care, inductive and diagnostic thinking, detailed record keeping, patient education, and communication with colleagues. Most of the hardware and software approaches that address one of these aspects of medical practice intrude unacceptably on some other aspect, e.g., computers are not yet as useful, universal, and handy as the stethoscope and other common medical technologies. In addition, medical practice is extraordinarily complex and it changes rapidly. Systematizing even the process of performing medical procedures, much less rationalizing the language and scientific knowledge underlying those procedures is an almost unruly problem (Dellecave, 1995).

Another point is that information technologies are expensive to implement and their benefits may be difficult to directly measure, even when all parties are happy with the results. This may delay their deployment in an industry whose sophisticated technological base is seen by some to be a driving force in making health care more expensive (HIMSS, 1995). Austin and Sobczak (1993) provide the example of Lincoln National Corporation, which invested over \$50 million to develop their own information system. The system was designed to pool a range of data from utilization to managed care products in order to improve healthcare quality and control costs. The original system incorporated over 120 managed care markets. It provided employers with the ability to assess effectiveness of selected benefits packages, as well as, the best combinations of benefits available to employees. Additionally, it allowed providers to verify eligibility and benefit data (Austin and Sobczak, 1993).

Invanisovich (1993) provided a description of how the Chrysler Corporation Health Plan formed a joint venture with Electronic Data Systems (EDS) to design a computer system to create improved communications between patients and providers by automation. The cost to

Ambulatory Data System: A Case Study-NHCL

develop this system was in excess of \$2 million; however, projected cost savings were as much as twenty-five percent through the reduction of paperwork and the establishment of a network of health care providers (Invanisovich, 1993).

It has become evident that there is a growth in the number of organizations utilizing some type of health care data system. Changes in the health care delivery system, including the emergence of managed health care and integrated delivery systems, are breaking down the organizational barriers that have stood between care providers, insurers, medical researchers, and public health professionals. Old distinctions between clinical health information and administrative health information are gradually eroding as new health care delivery patterns emerge that are supported by, and in some cases reliant on, the widespread use of networked computers and telecommunications (HIMSS, 1995).

Health care is an information intensive business where information and knowledge are as much a part of the service as are medications and treatments. Information is the essential ingredient needed to transform the healing art into the science of health care. It is only through the science of health care that health care costs can be reduced and quality improved. Health care providers have known this for hundreds of years and have implemented countless systems and methodologies to standardize and facilitate the collection, storage, and retrieval of health care information. Continuous advances in electronic information technology provide new opportunities to further improve these systems and methodologies and thus improve the quality of care while reducing the costs (Mahmud and Lenz, 1995).

Edward Chadwick, vice president and chief financial officer at 450-bed St. Joseph Mercy Hospital, Pontiac, MI states, "Information systems are only helpful so long as you have

Ambulatory Data System: A Case Study-NHCL management processes that allow you to use the data" (Johnson, 1991). These processes include determining and acquiring senior management's data requirements for strategic planning and daily operations, and passing this data to middle managers and providers to enable them to improve performance (Lastrapps, 1994).

Present requirements for continuous performance evaluation both to improve quality of services and to meet the scrutiny of regulatory agencies demands rapid access to output measures used in monitoring performance. St. Joseph's Chadwick states, "we believe the only way we are going to substantially change the cost of delivering care is to have front-line clinicians and physicians better understand the financial implications for what they do, and have better information to make resource decisions" (Lastrapps, 1996).

New patterns in health care delivery are enhancing the value of clinical health data and creating incentives for collecting and disseminating health information electronically within and between organizations. As managed care organizations grow and fee-for-service care wanes, doctors and other practitioners have a financial interest in delivering low-cost health care and incentives for documenting and analyzing their treatment practices (Slee and Deatricks, 1995).

Within the managed care arena, a reliable, flexible, efficient, and effective information system is crucial to organizational success. This system must provide a competitive edge, thereby acquiring more strategic function capability, as opposed to merely the traditional transactional system (Slee et al, 1996). This task is very difficult given the rapidity of change within the managed care business and the complexity associated with keeping pace technologically. For example, administrators in Health Maintenance Organizations (HMOs) and integrated delivery systems have long sought to reduce transaction costs by computerizing

Ambulatory Data System: A Case Study-NHCL  
internal communications and automating communications with suppliers and other business partners. In addition, they have a vested interest in understanding the clinical details of health care delivery in order to efficiently manage resources (Siwicki, 1995).

In managed care organizations, it is possible to use administrative records alone to limit overuse of optometry services by approving eye examinations purely on the basis of elapsed time since the last exam. However, care can be more prudently, and perhaps compassionately, managed by considering not only the time since last billing, but also the clinical record of that visit and other health information about the patient. Were the previous results normal, or did they indicate a problem? Does the patient have other conditions that might warrant more frequent eye examinations? Could the current complaint be due to an adverse reaction to a prescribed medication and, hence, warrant a visit to the prescribing physician rather than an optometrist? This fine-grained analysis of clinical records is contingent on standardization and digitization of clinical records because paper records are generally inadequate for these purposes (Vickery, 1996).

The MHSS has followed suit in investing in health care information systems and has a stake in helping to develop inexpensive, standardized approaches to information exchange so it can effectively fund medical research, manage widespread public health problems, reduce its administrative costs, and reduce the cost of the health care it purchases and provides through Medicare, Medicaid, Veterans' care, and employee insurance programs.

Private and governmental interests in digitizing health information in order to manage costs and integrate delivery of health services are manifest in a slow but perceptible trend toward standardization of health care information and optimization of care delivery. These processes are



occurring on many levels. The medical and computing communities are slowly developing

a) lexicons for consistently describing medical care, b) consensus standards for exchanging medical data between information systems, and c) models for how to collect and organize medical information digitally. Protocols for standardizing delivery of care and metrics for assessing the quality of health care services are being developed, as well as decision support systems that may increase the efficacy of medical decisions. Additionally, throughout the health care delivery system, innovative applications of information technologies are being studied, tested, and implemented (Little, 1996).

The introduction of an information system into an organization, whether for the first time or not, creates tremendous change on the organization. Organizational processes are altered; the extent of which depends upon the information system. The system will influence organizational operations and the organization will influence the effectiveness of the system (Tan, 1995).

According to Tan (1995), organizational structure, standard operating procedures, organizational culture and politics, internal and external environments, and management decisions are all mediating factors, which can impact upon the relationship between information systems and organizations. From this premise, it stands to reason, the impact of these factors will be as variable as the different types of organizations and information systems (Tan, 1995).

The microeconomics view of an organization suggests that the introduction of a new technology into the organization merely change the interaction of inputs, resulting in altered outputs. However, from a behavioral perspective, the introduction of a new information system is more than a technical event. Information technology change requires changes in who owns and controls information, who has access and update privileges to this information, and who

Ambulatory Data System: A Case Study-NHCL

makes decisions about whom, when, and how. Information is power! (Lastrapps, 1996)

Increased use of information technology will continue to affect the jobs of the 10 million Americans who work in health care. This workforce is currently growing at about 3.9 percent per year. Changes in the structure of health care delivery are affecting the composition of the workforce. For example, hospital employment, while it still represents half of those employed in health care, is the slowest growing sector at 1.7 percent per year. Home health care however, is growing at about 18 percent annually, although it still accounts for only a small portion of the workforce (U.S. Department of Commerce, 1994).

Information technology also can change job roles. For example, when physicians place medication orders at a computer terminal, they take on a data entry task that might previously have been done by a ward clerk, a pharmacist, or a pharmacy clerk. With proper design, the technology can help integrate this task with others the physician performs, e.g., retrieving information about the patient's condition, looking up the proper dosage and use of medications, or making judgments and decisions about additional tests and treatments. Whether data entry is an additional burden, or an integral part of an improved and more efficient process for rendering care, depends on a wide variety of personnel, institutional, hardware, software, and interface design factors (Parsons and Murdaugh, 1994).

In some cases, role changes are induced by other organizational changes in which information technology is a facilitator. For example, one way that health care organizations are reducing costs is by redesigning work so those tasks once performed by high-cost personnel are now completed by low cost personnel. In many cases, physician extenders like physician assistants and nurse practitioners are now performing primary health care previously provided by

Ambulatory Data System: A Case Study-NHCL physicians. In some hospitals, work previously performed by licensed and registered nurses is now done by nursing aides sometimes labeled patient care technicians, while nurses take on the role of managing a team of caregivers. This trend is typical of a "reengineering" movement in hospital management known as patient-centered care or patient-focused care, as opposed to department-focused care. Computer technologies including computer-based decision support tools and treatment protocols, online patient information systems, patient monitoring devices, and teleconferencing systems can support and assist people giving care in these new ways (Wall Street Journal, 1995).

The introduction of any new process or change can be difficult on an organization. Each organization consists of its own corporate culture and set of norms. If this culture or environment is disrupted by the introduction of a new system, resistance may be the first natural response (Invanesovich, 1993). Information systems can also impact and modify the life of organizations. These systems can effect the balance of power, rearrange the rights, privileges, and responsibilities, or alter the perception thereof. Consequently, the introduction of an information system, such as the MHSS ADS program, requires careful strategic and implementation planning, coupled with an understanding of the effects of organizational change and change management (Gillooly, 1995).

Additionally, those implementing a new information system into an organization must also possess a clear understanding of the organizational social factors. These social factors encompass the unique characteristics of the people in the organization, individually and in small and large groups. These characteristics also include the social patterns and personal interaction processes of each individual, that is how they work and how they socialize. In the aggregate, the

Ambulatory Data System: A Case Study-NHCL

(1) culture, (2) management style, (3) interaction processes, (4) informal patterns and networks, and (5) individual attributes constitute or comprise the informal organization (Porras and Robertson, 1992). The organization's social factors may act to restrain political conflict and other destructive behaviors by promoting commonality in understanding, agreement, and practices; however, these factors are the most difficult to change (Porras and Robertson, 1992).

Organizations such as the MHSS are no exception to the effects and impacts of the introduction of information systems. Conversely, change within the government tends to come with great resistance and confusion. Subsequently, the MHSS is highly susceptible to negative outcomes more so than civilian organizations. This may be due to the organizational structures within the federal health care system as they are typically highly politicized, structured, and hierarchical designs. Furthermore, the balance of power is dynamic, which in turn can significantly effect the distribution of allocated resources and the success of certain programs within the MHSS. These differences and political rifts can provide for potential areas for struggle, competition, and conflict.

As Laudon and Laudon (1994) found, political resistance within an organization is one of the greatest difficulties to overcome in introducing change. The introduction of a new information system can create a cesspool of political turmoil within the MHSS, because of the power of health care information as it relates to resource allocation. Therefore, information systems such as ADS that introduce significant change in goals, procedures, productivity, and personnel are naturally politically charged (Laudon and Laudon, 1994).

Given these obstacles, installation and efficient utilization of information technologies in health care will continue to be incremental and difficult. However, there are a number of reasons why the MHSS and the Federal Government may wish to actively support this process.

First, implementation of information technologies could lead to reductions in federal health care expenditures. The federal government is a major purchaser of health care through Medicare and Medicaid, and a major integrated provider and payer through its health care programs for military personnel, veterans, and Native Americans. While individual private sector organizations participating in health care delivery may find it difficult to realize financial benefits from systemic changes, the federal government is ideally situated to recoup whatever costs might be incurred. The recouping of federal dollars can be accomplished by substantially reducing its own health care costs through the adoption of information technologies at all levels of health care delivery. Researchers and others have suggested that multi-billion-dollar annual savings might be possible with increased use of information technologies in health care (Gorry, 1995).

Information technologies may also foster competition in the health care industry. Many advanced information technologies are used to evaluate the effectiveness of health care procedures and the efficiency of health care organizations. Although these techniques for quality assessment are highly problematic, they may represent an unprecedented metric by which organizations and practices can be compared and contrasted, thereby enabling consumers and managers to make more informed choices concerning their health care (Gorry, 1995).

Implementation of information technologies may help increase access to health care through private sector activities. Information technologies may allow health care providers to

Ambulatory Data System: A Case Study-NHCL

extend their reach in the communities they serve through telemedicine or other means for the electronic delivery of services. In addition, new technologies may help decentralize health care by increasing the flow of useful information to primary care doctors so that more people can have access to state-of-the-art health care without resorting to hospital or emergency room care. This consideration is especially important in rural communities and inner-city communities where the viability of large health care institutions is uncertain (Gillooly, 1995).

Information technologies could lead to systemic changes and opportunities that will enable the American health care system to better serve its citizens through more convenient and perhaps less expensive delivery of health services. Some of the benefits and conveniences, as well as some of the drawbacks of health care enhanced by information technology are apparent in elements such as telemedicine, enhanced patient health care information, medical “smart cards,” and new disease pattern management. Many other health care information system benefits, drawbacks, and influences will only become apparent once a broad information infrastructure is in place. Every new tool contains embedded ideas that go beyond the function of the tool itself (Shortliffe and Barnett, 1996).

Finally, when personal computers were developed, there was little indication or intention that they would rapidly develop into tools for individuals to publish and access information across the globe; the federal government played an important role in that development through its support of the development of the Internet's predecessor. This “high-tech-information craze” has now embedded itself in the future of healthcare and may now hold the portal to how organizations, payers, and providers access, report, and use health care information in the practice of medicine (Deming, 1995).

**Purpose**

The purpose of this case study is to analyze the NHCL ADS process, determine the factors preventing 100% ADS compliance, and present recommendations. The objectives of this case study are to review the 1) planning and implementation of ADS and clinical ADS processes, 2) analyze existing hospital Standard Operating Procedures (SOP), 3) evaluate system support and hardware configurations, and 4) determine the primary clinical challenges and barriers to 100% ADS compliance. Findings from this case study may be utilized to provide recommendations for future ADS utilization and compliance in other facilities within Region 2 who may be experiencing similar difficulties.

Ambulatory Data System: A Case Study-NHCL  
**CHAPTER 2**

**Methods and Procedures**

The research methodology chosen for this project is the case study process as developed by R. K. Yin. The case study approach as described by Yin, is the preferred strategy when "how" or "why" questions are posed, when the researcher has little control over events, and when the focus is on a contemporary phenomenon within some real-life context. Furthermore, a case study analysis has been shown to contribute uniquely to the knowledge base of an individual, organization or, political situation allowing the researcher the ability to retain the holistic and meaningful characteristics of real-life events (Yin, 1994).

An exploratory case study will be used for this project because the ADS compliance process is still in the initial stages at NHCL. Additionally, the compliance process does not have a defined time period for completion. As such, a qualitative research approach is appropriate since the purpose of this project is to describe events and methods, as well as, offer some determination of causality (Cooper and Emory, 1996).

According to Yin (1994), the case study offers the some distinctive advantages. These include the establishment of information that may point toward the formulation of hypotheses, the explanation and definition of concepts and variables for further study, and methods for measuring the variables. The primary disadvantage of the case study methodology is the inability to infer findings upon a larger population (Yin, 1994).

This case study will rely upon several resources. These include a comprehensive review of current literature, interviews with NHCL staff members, and an extensive review of pertinent public and institutional documents.



## Ambulatory Data System: A Case Study-NHCL

The research design for this case study will have five components (Yin, 1994): 1) the study's question—what are the challenges/barriers to ADS compliance at NHCL?; 2) its propositions—these proposition will be related to results generated through this study: a) leadership: ADS compliance is a positively related to management support for ADS; b) education/training: the level of ADS compliance increases as the level of education and training of the users increases; c) staff understanding/acceptance: the level of ADS compliance increases as the level of understanding of the purpose of ADS increases; d) staffing: the number of users within a clinic dedicated to ADS is positively related to ADS compliance; e) system reliability/functionality: the reliability and functionality of the system is positively related to ADS compliance; and f) ADS coding: as ADS coding training and understanding increases so does the level of ADS data accuracy and validity; 3) its units of analysis—the hospital clinic's ADS compliance, specifically, the number of ambulatory encounters entered into ADS versus the number of encounters properly processed through ADS; 4) the logic linking the data to the propositions—the ability to link the results of the study to the level of clinic ADS compliance. The inability to collect timely and accurate data prevents NHCL from determining the costs of delivering ambulatory services and submission of accurate workload. This inaccurate data makes it impossible for evaluation of NHCL resource optimization, revised financing, and MCSC contracts for cost-effectiveness; and 5) the criteria for interpreting the findings—analysis of ambulatory care clinical areas' active implementation, utilization, and compliance with ADS, analysis of ADS functionality data, and comparative analysis of study results as they relate to comparison of clinics that are more ADS compliant with those that are not. The successful ADS compliant clinics are defined as those registering an ADS compliance rate of 90% or greater.

## Ambulatory Data System: A Case Study-NHCL

A descriptive, not a causation process will be used to develop the case study under the Yin principles. Approximately one week prior to their scheduled ADS study visit, each clinical department head within the internal hospital clinics, branch clinics, and contracted primary care clinics will be called and briefed. The briefing will inform the department of the purpose of the visit and study and each clinic will be asked to make the following personnel available for interview: their ADS super-users, clinicians who are using ADS, and clinic support staff involved in processing ADS encounters.

During the clinical visits, the ADS Interview Sheet, Appendix A will be used to gather the information pertinent to the factors effecting ADS compliance. ADS compliance is defined as the difference between the number of ADS encounters entered in to the ADS, versus the number of ADS encounters properly processed within ADS. For example, if a clinic has 100 appointments entered into ADS, 100 ADS overlay sheets will be generated. These ADS overlays will pertain to a specific patient visit. This visit must then be properly coded by the provider and entered into ADS to “close” the specific encounter. If this is not done, this ADS encounter is left “open” as is counted as a non-compliant ADS encounter (100 ADS encounters, 50 closed and 50 open equals 50% ADS compliance). The method by which the specific factors precluding clinical ADS compliance will be determined by the challenges and barriers described in Appendix A.

The basis for the categories contained in Appendix A, were devised following an extensive literature review of the ADS Navy-wide implementation process. Each category represents a major area of concern regarding ADS (ADS, 1998). Each clinic will be asked to describe difficulties within each of the categories. All interviews will be conducted in person; no

Ambulatory Data System: A Case Study-NHCL surveys will be conducted via telephone. There is some overlap in categories, e.g. system hardware, system management and system support. This overlap is designed to hone in on the specific ADS problem.

The interview will be held with the various clinical representatives in a meeting format. During the interview, the clinic staff will be able asked to describe their perceptions of ADS, the ADS and TPC processes, the difficulties that they are experiencing in system use, and the benefits they have been able to derive from ADS data capture. Extensive notes of the comments will be taken, and additional questions will be asked for clarification in order to ensure complete understanding of each comment's content and context.

Upon completion of all clinic visits, a final consolidated issue list will be prepared. Clinic issues that are similar and repetitive will be combined for brevity. All ADS issues will be organized into categories. Additionally, a recommendation for resolution will be prepared for each ADS issue to include the individual or group responsible for implementation, and the relative importance for system successful compliance. The complete recommendation list is included as Appendix B. The issue's major categories identified are: 1) Leadership - includes the formal direction from the upper levels of the organization to those responsible for administering ADS. This category also includes internal marketing, encouragement, command emphasis, the establishment and support of project management teams, system compliance, and process guidance; 2) Staffing - all aspects of personnel staffing that affect ADS implementation, operation, compliance, and maintenance; 3) System Performance - all issues related to performance, reliability, and availability of ADS to the end users; 4) System Management - all issues related to system administration and support; 5) System Hardware - hardware failures,

Ambulatory Data System: A Case Study-NHCL configuration, and device placement; 6) Support - providing information, training, and user assistance to all categories of personnel involved with the system; 7) Data Capture - includes all issues relative to the capture of ambulatory encounter data in the database from a functional process perspective; 8) Data Use - all issues related to report generation and data availability for other uses such as third party collections; 9) Data Accuracy/Integrity – all issues relating to data accuracy, specifically the comparison of ADS to CHCS data; 10) Coding - all issues relating to ADS coding of the bubble-sheets; 11) Challenges/Barriers - all other issues that may not fit into the above categories, including the primary reasons for the individual clinic's inability or ability to achieve 100% ADS compliance (ADS, 1998).

According to Whiting (1995), once the case study is complete, before it can become useful or validated, issues regarding the quality of the study must be resolved. This quality requirement is always pertinent, regardless of the appraisal procedure (Whiting, 1995). Validity and reliability must be established as a measure of quality. According to Yin, four tests are common to all social science methods: construct validity, internal validity, external validity, and reliability (Yin, 1994).

Internal validity establishes a causal relationship. As stated by Yin, internal validity is not intended for use in exploratory studies (Yin, 1994) and therefore is not applicable in this research.

External validity establishes the domain to which a study's findings can be generalized (Cooper and Emory, 1994). This case study will involve all of the NHCL clinics where ambulatory care workload can be delivered. Naval Hospital Camp Lejeune is a medium-sized multi-service, military medical facility. Within NHCL's organizational structure are eight

Ambulatory Data System: A Case Study-NHCL directorates, each effected both directly and indirectly by the provision of ambulatory care. The findings from this study may provide information and guidance for ADS compliance at other MTFs of similar size.

External validity for this case study will be established through empirical evidence gathered from multiple sources. Every effort will be made to use primary documents, which provide for greater validity than secondary sources.

Reliability describes the degree to which the stability of the measurement or certain occurrences can be counted upon for the same results (Yin, 1994). The documentation and data provided from the case study interview process will serve as the basis of reliability, thereby allowing for duplication of the study's findings.

Ambulatory Data System: A Case Study-NHCL  
**CHAPTER 3**

**Results**

During the clinic visits, the clinic staff described their perceptions of ADS, the difficulties that they were experiencing in system use, and the benefits they had been able to derive from ADS data capture. During these encounters, comprehensive notes of the comments made were taken, and follow-up questions were asked to clarify and to ensure complete understanding of each comment's content and context.

As originally expected, the results of this case study did not fall into any unexpected category. Based on the completed initial interviews, there are patterns that formed within the expected categories, indicating the reasons for ADS non-compliance.

The following are the results of this study listed in their respective categories, as detailed in the methodology section:

**A. Leadership:**

(1) Many clinic ADS super-users expressed that the success of the ADS compliance rate is based on the priority of ADS set by the Commanding Officer, the clinical Department Heads, and the individual providers. It is apparent that if the senior leadership does not support the ADS process or compliance, nor will the individual clinic ADS users. The main area of concern, however, is not at the Commanding Officer level as he is a proponent and supporter of ADS. Rather, it is at the Department Head and provider level where many choose to non-comply with ADS procedures, disregard the ADS process, and are unwilling to ensure the accurate and timely submission of ADS forms. The more successful of the clinics were those that had taken a strong leadership and internal marketing position. All of the clinics indicated that until October 1998

Ambulatory Data System: A Case Study-NHCL

and the inception of this case study, ADS was not seen as a priority and that it was being relatively ignored in the belief that the system would be phased out. It is noted that as ADS became a priority and some clinics developed a structure to ensure that it was clear that the facility leadership was supportive of the ADS process, ADS compliance increased.

(2) All clinics expressed frustration with the lack of clear ADS guidance and management structure within the MTF. They were concerned with receiving conflicting information and not having a clear chain of resolution to problems i.e. no single ADS officer, point of contact, or “ADS owner.” At NHCL, there is no clear project management structure in place and no clear accountabilities for senior clinicians, clerical/administrative staff, or information management staff.

**B. Staffing:**

(1) Many clinics complained that their staffing was inadequate and they were simply unable to dedicate a person to ADS and that the ADS super-user was just a label given as a collateral duty to one of their corpsman or civilians. In fact, a majority of the clinic super-users were not properly trained, using multiple ADS keys to access the system, experiencing high turnover, and no secondary users assigned.

(2) Every clinic complained that ADS imposed additional workload on the staff, especially the clinic front desk personnel. The estimates varied, but it was generally felt that it takes at least 1.5 full time equivalents in each clinic to accommodate the additional ADS system operation and maintenance.

(3) Most clinics stated that the use of ADS reduces their time available to deliver patient care. They saw anything that reduced the number of patients that could be seen in their clinics as a reduction in efficiency.

(4) Every clinic complained that there was no continuity in ADS staffing. Many of the people responsible for initial ADS implementation, who had been trained for ADS, have left the command to include clinic super-users and information management personnel.

#### C. System Performance:

(1) A lack of system reliability was a common clinic complaint. Clinics reported that they had to reboot the system to “unlock” the system or correct other problems. Daily rebooting was required at some clinics. Additionally, many clinics reported a 30-minute automatic shut-off. Once the shut-off occurred they had to totally reboot the system to regain access.

(2) The number of clinic users and “sharers” of network accesses seems to be directly related to systems performance. Clinics with a large number of like-users appeared to suffer system degradation more often, and required rebooting more frequently.

(3) All clinics expressed dissatisfaction with the failure to adequately design the system to meet user needs and to test the system as a whole prior to installation at operational clinics. There was no formal operational test and evaluation that met the rigor to identify the deficiencies that have been experienced.

#### D. System Management:

(1) All clinics recommended changes to improve the ability to operate and maintain ADS from a system administrator’s perspective. For example, they would like to be able to add users more efficiently through the use of user type profiles rather than have to enter information such



Ambulatory Data System: A Case Study-NHCL  
as user demographics, passwords, and other information to define access for each user  
individually.

(2) Many clinics sited the need for better software tools for monitoring and managing the system. Some of the problems that result in system failures described under the previous paragraph might be mitigated if tools were in place to warn the administrator and allow for a proactive response.

(3) System super-users would like more extensive user key (the ability to access ADS for different levels/functions) i.e. the key to be able to develop their own specific clinic ADS templates. Currently, each clinic must submit requests to information management to get their templates modified.

#### E. System Hardware:

(1) Hardware Availability: All clinics felt strongly that they need more end user devices, including workstations, printers, and scanners. Additionally, current devices need to be moved to a more user efficient location (possibly a centralized location). Thus functions such as on-line editing and report creation, which must be accomplished at the clinic front desk where the devices were placed, inhibit clinic staff from efficiently processing clinic patients and undisturbed administration time to process ADS forms.

(2) Reliability: A number of hardware devices had high failure rates. The printer network mini-hubs used by the Navy tend to cause system failures or other problems that affected system reliability.

(3) Scanners: Scanners require basic maintenance on a regularly scheduled basis to prevent scanning errors. Some users complained of a lack of instruction on proper maintenance

Ambulatory Data System: A Case Study-NHCL methods. Also, the sensitivity settings within the scanner software was questioned due to a relatively high rate of scanning errors that appeared to be inappropriate when cross-checked with information bubbled on the encounter form. Additionally, many users complained that scanners gave errors on overlays scanned and either these errors were not listed in the manual or when rescanned the overlay was accepted, thus often doubling their time spent scanning.

(4) Printers: The brand of printer that was purchased through the government contract requires extra careful loading of the blank forms in order to prevent alignment problems during the scanning process. It was also noted that the higher the workload on this type of printer, the greater the chance for problems.

F. Support:

(1) User Assistance/POC: User assistance is currently limited to help from fellow ADS super-users, there is no one internal MTF point of contact for clinics to contact for assistance or to address problems. Depending on the difficulty a clinic user may be experiencing, they may have to contact four different areas to get a resolution to their problem i.e. third party collections, patient administration, information management, and the director for clinical services. To initially alleviate this strain and confusion, an ADS Issues Team was developed so user groups can share lessons learned and help control rumors.

(2) Information Management Department (IRMD) Help Desk: All clinics complained about the lack of responsive assistance from the IRMD help desk. Users complained that there was no follow up on the problems that they reported, and that several serious problems remained unsolved for weeks or months. A number of clinics reported incidents of the server being down

Ambulatory Data System: A Case Study-NHCL

for extended periods while the help desk tried to talk the clinic personnel through fixes for days before dispatching a staff member to the clinic.

(3) Maintenance: Hardware maintenance contracts are not being utilized to their fullest extent. Clinic users report that many reoccurring problems persist for days and even weeks.

(4) Training: All clinics criticized the initial ADS training that they received. It was considered too short, did not train for report generation, and was in some cases, not tailored for the class audience. Most clinics noted a lack of adequate sustainment training or adequate follow-up training for staff turnover. Three clinics with the most satisfied clinical users were the clinics that spent the most time and effort on the training for standard and ad hoc reports. Many clinicians at all clinics were very anxious to be able to generate reports to use the data. Only at that three clinics mentioned above, were reports being used to any extent. Clinicians at other clinics either complained that they had not been trained on report generation at all or had only been trained on standard reports that were of too limited use for their purposes.

#### G. Data Capture:

- (1) The data capture process can be looked at in segments. The process requires:
  - (a) making a patient appointment in CHCS;
  - (b) generation of an ADS encounter form prior to the patient being seen by the clinician;
  - (c) annotation by the patient on the form of any changes in address or insurance information;
  - (d) submission of the form to the clinician by the patient at the time of the appointment;
  - (e) the clinician marking the one or more preprinted diagnoses and procedures on the form and the annotation on the form of patient disposition;

#### Ambulatory Data System: A Case Study-NHCL

- (f) the collection of the form by the clinic administrative personnel from the patient subsequent to the visit;
- (g) the scanning of the form;
- (h) the generation of a discrepancy report subsequent to scanning;
- (i) the correction of any discrepancies through the use of an on-line editing process by the clinic's administrative personnel;
- (j) the annotation in CHCS that the appointment had been kept;
- (k) the generation of an ADS encounter form status report that identifies the number of forms generated, the number scanned and complete, the number scanned but with discrepancies that need resolution and the number of unscanned forms.

A variety of problems can and do occur during all facets of this data capture process, the process of collecting completed forms, scanning the forms and correcting discrepancies can be a very complex process with many potential points of failure. As an example, some clinics rely on the patient to deliver the form back to the clinic front desk staff following their visit with the clinician, and in some cases they do not do so. Additional points of potential errors include: scanning errors, inaccurate demographic data, no-shows, inaccurate coding, no follow-up on discrepancies reports, open ADS forms not properly processed, and inaccurate workload numbers due to lack of data capture.

(2) Front Desk Procedures: Currently, many clinic front desk staff correct discrepancies that are reported subsequent to the scanning through an on-line process using workstations in the clinic area. Generally these workstations are at the front desk and making these corrections often either impedes the processing of patients at the front desk or must be done after the clinic closes. Several clinics reported that their ADS users were spending many hours in the evenings and at night to catch up on backlogs in the correction process. Many clinic staff criticized the on-line

Ambulatory Data System: A Case Study-NHCL

editing process as not user friendly and as requiring more screen navigation and effort than should be necessary.

(3) Walk-ins: A Major Data Capture Problem: Walk-in patients pose management problems for clinics and greatly aggravated by ADS. All clinics stated that their walk-in rates were approximately 45% prior to ADS implementation. Only one clinic had implemented a process to significantly reduce that rate to approximately 20%. Walk-in patients necessitate the generation of an ADS encounter form at the time the patient arrives. The process involves interaction with both the CHCS and ADS. All clinics requested system changes to streamline this process. From the business practice viewpoint, reducing the number of non-appointed patients at the MTF should be a goal to help alleviate the burden placed on clinic front desk personnel. Because this process is deemed burdensome by many clinics, they simply do not walk-in into ADS, all their walk-in patients. This process causes inaccurate workload data, which appears on the Surgeon General SATR Report (this report indicates the number of outpatient visits in CHCS versus the number of visits in ADS, ADS should be equal to or higher to CHCS).

#### H. Data Use:

(1) All clinics indicated a desperate need for process guidance from Health Affairs. The real purpose for the use of ADS was questioned. Is its primary purpose to address revised financing?; to increase third party collections?; to collect data to make adjustments to the managed care support contracts?; collect hospital workload information, with the ultimate purpose to determine resources i.e. staffing and budgets?; or is it to collect information for clinical purposes?

#### Ambulatory Data System: A Case Study-NHCL

(2) According to many providers, ADS does not allow the clinicians to capture the precise diagnosis. In many cases, the code that is recorded on the ADS form is not incorrect but the use of a different code would provide a clearer indication of the patient's condition. Likewise, clinicians state that ADS does not, in many cases, allow them to capture all of the significant information for procedures that they perform.

(3) Many clinicians are concerned that the information submitted from ADS to third party collection office may be incorrect. They also are concerned that resource decisions may be made by the Command without regard to the differences in patient complexity that is not represented in the ADS data. They are concerned that decisions on budget, staffing and their personal performance will be inappropriate and could adversely affect their clinics and ultimately the Command.

(4) Data Capture & ADS Overlays: Much discussion was heard concerning the use and possible replacement of the overlays. There were complaints that the form did not allow for sufficient numbers of codes to be placed on the forms. Most clinicians stated that they were unable to identify all of the providers and ancillary services involved in treating the patient during an encounter. One clinic complained that the form paper stock caused scanning problems. ADS forms generation for walk-ins and telephone consults was considered too cumbersome to adequately support the volumes of those types of encounters. Many users desired an electronic user front-end replacement for the overlay.

(5) Ad-Hoc Reports: The standard and ad hoc reports within ADS are not judged to be easily usable nor adequate to provide the type of information that is needed by clinicians and others. Increased training on the use of both of these kinds of reports increases the usability of

these reports. The ability for clinicians to obtain information from ADS has a significant positive affect on the acceptance of ADS.

I. Data Accuracy/Integrity:

(1) ADS Metric: The ADS utilization metric reported to the SG is not understood at the clinic level. Their own calculated percentage of utilization did not match the metric data being reported. It was clear that there was not adequate information to the clinics on the purpose and calculation algorithm for that metric. In fact, the NHCL ADS Issues Team recognized deficiencies in the currently reported metric and has been working to resolve them. Additionally, many clinics feared that this metric would be used for Health Affairs level staffing and budget decisions without taking into account the data quality or consistency.

(2) ADS Validity: There is major concern about the validity of the data in ADS reports because of differences in information on a given report when that was run more than once in close succession. It wasn't clear whether this had been adequately explored to determine if there was a system problem or if the data had been legitimately changed between the running of the two reports. In any case, the observation generated a discussion and recommendation about the level of data validation that had been accomplished during the system testing and subsequently at the clinics.

J. Coding:

(1) Clinics generally believed that they needed more information on coding. Clinicians at some clinics didn't receive enough of an explanation of the purpose for ADS (billing vs. clinical information), the level of detail of coding desired, and how to deal with the non-routine diagnoses and procedures. Clinicians indicated that their professional specialty societies offered

Ambulatory Data System: A Case Study-NHCL  
training conferences in coding specific to their specialty and suggested that such courses would be much more valuable than generic training on coding.

(2) There are many sub-categories of difficulties in the coding of the ADS forms. Many clinics are using out dated codebooks and, therefore, they are experiencing numerous scanning errors. Other clinics are using ADS overlays that no longer reflect the current routine codes associated with the patients seen by the clinic, and still others are not properly documenting their actual workload using the respective codes.

(3) Many clinicians complained that coding “uncommon” diagnoses and procedures was time consuming and impeded their efficiency.

#### K. Challenges/Barriers:

This result section was designed to pinpoint and prioritize the major challenges and barriers to ADS and ADS Compliance

The major concerns are:

- 1) staffing shortages/turnover of clinic super-users
- 2) device availability/maintenance
- 3) a single/central ADS point of contact
- 4) coding and coding training
- 5) the system design for data capture (Overlays and on-line editing)
- 6) the business practice changes required for the system
- 7) the resources required in support of the business practices
- 8) the lack of policy guidance for system use
- 9) the ability to extract and visualize the data captured
- 10) the need for integration of its intended use with other system outputs
- 11) deficiencies in user training
- 12) deficiencies in user support at the MTF, Service, and H. A. levels



#### Ambulatory Data System: A Case Study-NHCL

The results of this case study begin to frame the difficulties NHCL is experiencing and sheds light on the numerous factors contributing to the ADS non-compliance dilemma. Additionally, these results amplify the need for NHCL senior leadership to become actively involved with ADS support and policy making. As the shift toward using ADS data to determine resources continues, the success of NHCL may ultimately result from their actions to these ADS problems. The following sections provide a ADS discussion covering the studies propositions support and potential ADS recommendations to each of the result areas detailed above.

Ambulatory Data System: A Case Study-NHCL  
**CHAPTER 4**

**Discussion/Proposition Support**

By the end of 1997, all Navy MTFs must have implemented ADS. This is was a system-wide mandate, not a recommendation, and reflected the need for the corporate quantitative assessment and tracking of clinical outcomes. It also reflects a growing requirement for the use of outcomes-based decision support data in day-to-day health care delivery (ADS, 1998).

Although NHCL ADS was fully implemented by the end of 1997, there have been many problems with its operation, processes, data capture, and overall compliance. These problems have resulted in many systemic, as well as personal frustrations and inconsistencies. NHCL has realized the need to improve their ADS process. Subsequently, this study has become the foundation and starting point to a new beginning for NHCL ADS accuracy and compliance.

As stated in the methodology section, there were five components of research design for this descriptive case study: 1) the study question; 2) the study propositions; 3) the units of analysis; 4) the logic linking the data to the propositions; and 5) criteria for interpreting the findings.

The study question, “what are the challenge/barriers to ADS compliance at NHCL?” has been addressed in both the results section and the following recommendations section of this study. NHCL’s ADS Issues Team using this studies findings, as a catalyst to change has begun to implement an ADS strategic plan to address each of the concerns and review each of the recommendations presented.

Each of the case study propositions: leadership- ADS compliance is a positively related to management support for ADS; education/training- the level of ADS compliance increases as the

Ambulatory Data System: A Case Study-NHCL

level of education and training of the users increases; staff understanding and acceptance- the level of ADS compliance increases as the level of understanding of the purpose of ADS increases; staffing- the number of users within a clinic dedicated to ADS is positively related to ADS compliance; system reliability/functionality- the reliability and functionality of the system is positively related to ADS compliance; and ADS coding- as ADS coding training and understanding increases so does the level of ADS data accuracy and validity, have been found to be supported by the case study results. The successful ADS clinics are those registering an ADS compliance percentage of 90% or above (refer to Appendix C).

The statistics in Appendix C represent merely a snapshot of the data spreadsheets used to correlate ADS compliance data. However, what Appendix C displays is the increase in clinic ADS compliance over the last six months compared to the previous year. This study, being descriptive in nature, there was no attempt made to draw direct conclusions from this data in order to determine causation. However, by reviewing the clinic ADS compliance data and the results from Appendix A, it became apparent that those clinics shown to be successful with ADS compliance were also the clinics that were supported by senior leadership, have both a primary and secondary ADS user, thought the education and training process was effective, had little trouble with the system reliability, and had some training or experience with procedure coding. From these comparisons, each of the propositions was shown to have a positive relationship and as the factors (leadership, training, experience, etc.) increased so did clinic ADS compliance.

Additionally, throughout the six-month period covering 1 October 1998 to 31 March 1999, the ADS Issues Team began to target those clinics answering negatively to the stated factors and displaying low ADS compliance. This targeting included ADS awareness training to senior

Ambulatory Data System: A Case Study-NHCL leadership, increased super-user training, additional coding classes, and the development of an ADS standard operation procedures manual (to include third party collections “cheat-sheet).” It was noted that after this six-month targeting there was an increase in clinic ADS compliance, show in Appendix C as percentage change.

The logic linking of the ADS data to ADS compliance was accomplished through interpretation of ADS compliance statistics, Appendix C, and the results compiled in Appendix A. It was determined that as the results compiled using Appendix A, indicated a positive correlation to the ADS compliance percentages in Appendix C. As address in proposition (2), by reviewing ADS compliance data and matching it to those clinics that were high in leadership, education, support, staffing, and ADS understanding it was possible to draw the link that ADS compliance was positively related to high incidence of these factors.

Lastly, the criteria for interpreting the findings was done by analysis of ambulatory care clinical areas’ active utilization, and compliance with ADS, analysis of ADS functionality data, and comparative analysis of study results as they relate to comparison of clinics that are more ADS compliant with those that are not.

Currently, the ADS Issues Team is addressing the appointment of a single ADS owner, researching the purchasing of additional coding training programs, and reviewing the following case study recommendations for MTF implementation.

Ambulatory Data System: A Case Study-NHCL  
**CHAPTER 5**

**Recommendations**

The categorized results of this descriptive case study have pinpointed many of the reasons why NHCL is experiencing difficulties with ADS compliance. Now, the challenge lies in recommending what course of action will be necessary to correct each problem. Many of the ADS problem areas fall into similar categories and subsequently; the proposed recommendations may be suitable solutions for a number of the clinics. However, some ADS problems may entail additional individual clinic planning and modification in order to develop some type of resolution. Additionally, some ADS system and compliance problems are unable to be fixed at the MTF level; therefore, the Office of the Assistant Secretary of Defense, Health Affairs ((OASD(HA))) and the Clinical Business Area (CBA), Washington, D.C will have to be informed in order to enact recommendations.

Each recommendation category corresponds with an associated result category listed in the results section of this study. ADS issues and recommendations:

**A. Leadership:**

**(1) Senior level management support is essential to ADS validity and compliance:**

Recommendation: NHCL Executive Steering Counsel (ESC) level involvement should be included in clinical ADS evaluation. Clinics that were most successful with ADS compliance had established ADS management guidance, support, and prioritization of effort at the Department Head and/or Directors level. These clinics had clearer direction and support than clinics where the leadership was not as visibly and actively involved.

**(2) Clinic Standard Operating Procedures (SOPs) for ADS process must be established.**

Recommendation: Process planning and execution concepts (SOPs) for ADS management and processes at all levels of NHCL command structure should be established. ADS daily processes should receive priority in each clinic until the system is well established in its operation and understanding. Until each clinic has a standardized ADS process in place, the ADS Issues team should continue to operate and be supported by the ESC. The ADS Issues team should be headed by a senior clinician respected by both clinical and administrative staffs. The misperception that ADS is merely another administrative support system would be minimized. Additionally, senior clinical leadership would greatly enhanced clinical staff understanding of system uses and benefits.

**(3) Command support of the multidisciplinary ADS Issues team is essential.**

Recommendation: The multidisciplinary ADS Issues team should be supported at the ESC level. Senior leadership would greatly enhance clinical staff and administrative understanding of system uses and benefits to all levels within the ADS process. If the ESC thinks ADS is a priority so will the clinics

**(4) Establish a NHCL Annual Plan Goal for ADS policies, monitoring and training.**

Recommendation: The ESC should incorporate an ADS oriented goal in its NHCL Annual Plan. This goal should cover business practices and processes for ADS use and compliance. Clinic users have indicated that ADS requires them to change or modify business practices within the clinic. While ADS as a system was not designed to require business process changes, it has in some cases had that effect. Continued ESC evaluation of system requirements and associated business practice through an annual goal is necessary to properly monitor ADS process, and compliance.

**(5) Clinical interfaces and delegations among stakeholders in the process must be defined,**

Recommendation: Specific duties and responsibilities of each individual or department involvement in ADS should be identified, detailed, and understood to include super-users, IRMD, third party collections, patient administration (coding), and managed care department (ADS data/SG compliance). These functions could be written in the ADS SOPs.

**B. Staffing:**

**(1) Clinics need expertise to employ staff effectively.**

Recommendation: ADS clinical processes should receive priority in the Command Position Management Committee and in the Personnel Management Department until the system is better established in its operation and understanding. Until the implementation process is completed, including the solution of appropriate business practice issues, the clinics that are in need of ADS resources should to be supported by ESC and ADS Issues team.

**(2) Other clinic activities impose staffing challenges.**

Recommendation: ADS implementation processes and related business practice management should have a high enough priority post patient care so that ADS compliance is an issues for all clinics. Internal ADS processes and compliance accountability should be lead by the most expert staff member available to the clinic. Of the clinics, those that were successful had senior and experienced clinical and administrative staff involvement in the ADS process. While some more junior department heads, super-users and staff members were energetic and making serious efforts, in some cases their lack of ADS experience had lead to poorly planned and problematic ADS processes and compliance standards.

**(3) Review clinic ADS administration and IRMD systems administration resources for adequacy.**

Recommendation: Similar to recommendation (1) of this section, Position Management needs to place emphasis on key staff selection relative to ADS clinic administration and supporting systems administration. The monitoring and integration of system support to a clinic's business practice requires individual clinic and MTF staff leadership and mentoring. Additional thought needs to be given to appointing a single point of contact for the clinics and/or centralizing the ADS process in to a NHCL business office. Both of these recommendations would significantly reduce ADS data inaccuracies and noncompliance through centralized ADS business practices that are supervised and processed in one area of the hospital vice each separate clinic.

**C. System Performance:**

**(1) System parameter adjustment training is inadequate.**

Recommendation: The NHCL IRMD systems administrators need to fully understand the ADS instructions for system parameters and settings, including server configuration optimization and system sizing considerations. This should be an ongoing activity. Based on this, IRMD in conjunction with HA and the CBA, MTF ADS should evaluate system architecture, hardware solutions chosen, and device placement decisions, and network support requirements. This evaluation should be a continuing part of the overall ADS life cycle management program.

**(2) ADS System problems must be investigated (printing, scanning jobs).**



Recommendation: Users complain that much data is lost at the time of a system failure.

Software evaluation should be made to determine a possible improvement to ensure that data entered up to the time of a system failure is saved to the database. Therefore, ADS core system functions should be evaluated for improved data retention up to the time of a system failure. This recommendation should be accomplished with IRMD and the CBA.

**(3) ADS system losses/adds clinics without apparent logic or user intervention.**

Recommendation: Same recommendation as (2) this section.

**(4) Systems often need to be rebooted to resolve problems.**

Recommendation: The audit file, an integral part of system security measures, fills at a rapid rate that exceeds system capacity for such data storage. This causes system maintenance problems that have lead to IRMD turning off the audit capability. ADS system audit file relative to system capacity should be evaluated for improvement. This recommendation should be accomplished with IRMD and the CBA.

**D. System Management:**

Many of the recommendations listed in the Support Section also will improve ADS Systems Management.

**(1) Maintenance of system user files is time intensive.**

Recommendation: Design for system user files maintenance should be streamlined. User file maintenance is currently cumbersome and time intensive. Each server on whom a user account resides must be separately updated for changes/additions. The system software should be improved to allow for user account maintenance to be accomplished in a more automated format. This recommendation should be accomplished with IRMD and the CBA.

**(2) ADS System review of event patterns, key issuance, and logging requirements.**

Recommendation: A review of system event patterns and logging requirements is needed as the basis for improved system administrator tools. Current system logs at a representative sample of clinics should be reviewed for patterns suggesting improvements to system administration tools. System architectures, sizing parameters, and network support will play a part of this analysis. This recommendation should be accomplished with IRMD and the CBA.

**E. Hardware:**

**(1) Additional ADS user devices are needed.**

Recommendation: The NHCL Equipment Procurement Committee or HA/Services should make resources for the procurement of additional ADS devices available. Based on system user experience, there is already a desire to expand the number of workstations within many clinics. Additional, unresourced funds will be required to accomplish this objective.

**(2) End user device placement should be evaluated.**

Recommendation: IRMD needs to evaluate each clinic for system architecture, hardware, device placement, and network support requirements. Research shows that some Navy MTFs, the clinic front desk staff must take their forms to other locations in the facility for scanning. In other facilities the scanners are centralized and staff dedicated to scanning retrieve the forms from the clinics and perform all of the scanning. Either of these processes can be made to work with appropriate detailed planning. As discussed in resource allocation of staffing above a centralized NHCL business office may be the solution to ADS data noncompliance, limited resources (people and equipment), and data inaccuracies.

**(3) Evaluate hardware maintenance support.**

Recommendation: NHCL along with HA/Services should evaluate current ADS hardware maintenance support contracts on the basis of expeditious and reliable user support. Repetitive complaints were heard concerning the lack of hardware maintenance support. It was perceived either non-existent, or inappropriately slow.

**(4) Network mini-hub failures were not uncommon.**

Recommendation: As in the recommendation above, service contract need to be reviewed.

Additionally, after speaking to CBA I informed IRMD of the available support available from Region 2 information resources department and the current TMSSC support hot line number is: 1-800-600-9332. (DSN: 240-4150).

**(5) Scanner alignment and sensitivity problems cause data on forms to be misread.**

Recommendation: IRMD is in the process of evaluating scanners and associated software for sensitivity settings. The scanner software allows for individual device sensitivity settings relative to identifying data on scanned forms, and the production of associated error messages. Per CBA, such settings should be reviewed to ensure the optimal efficiency for the scanning process, which will directly affect the quality of data capture, and user operations and satisfaction.

**(6) Printer jams are common.**

Recommendation: Printers selected for use should be evaluated for reliability with ADS use.

Device placement, i.e., the need for additional printers, and system sizing may also play a role in this issue.

**F. Support:**

**(1) ADS support is inadequate.**

Recommendation: As addressed in the staffing section, the monitoring and integration of system support to a clinic's business practice requires individual clinic and MTF staff leadership and mentoring. Additional thought needs to be given to appointing a single point of contact for the clinics and/or centralizing the ADS process in to a NHCL business office. Both of these recommendations would significantly reduce ADS data inaccuracies and noncompliance through centralized ADS business practices that are supervised and processed in one area of the hospital vice each separate clinic. ADS use and compliance should receive high priority in the clinics and with senior leadership. Without this support ADS will continue to be viewed as a low priority issue that if ignored will go away.

**(2) Command support of the multidisciplinary ADS Issues team is essential.**

Recommendation: For continuity and information dissemination the ADS Issues team should continue to function to address ADS issues, share lessons, control rumors. The team is linked via e-mail, and meets every other week to discuss ADS issues. This team must stress the importance of clinic involvement through a multidisciplinary group, including both clinical and administrative staffs have proven success in the efficiency and effectiveness of ADS use and compliance. Also, the NHCL home page via the Internet is currently an available option that should be explored as a means of ADS user support.

**(3) ADS overlay maintenance support needs improvement**

Recommendation: NHCL needs to ensure positive control of the scanning process, to include equipment placement and staffing, whether in a centralized or decentralized mode. Unnecessary errors at this step cause work backlogs in the entire data collection process. Clinic users

Ambulatory Data System: A Case Study-NHCL performing the scanning process must be held accountable by their supervisors for their work performance. Additionally, they must have been properly trained in both forms scanning procedures and scanner hardware user maintenance.

**(4) IRMD help desk & training.**

Recommendation: IRMD should consider consolidating help desk and ADS training staff positions. The combination of these two positions may maximize the effectiveness of both functions. Subsequently, ADS clinic super-user sustainment training for ADS functions would incorporate help desk lessons learned.

**(5) An ADS problem resolution process must be well understood by users; responsiveness to user problems is inadequate**

Recommendation: NHCL-IRMD should provide and train users with adequate and timely processes for system problem resolution. IRMD must include establishing user support in the help desk function, proper user training for appropriate use that function, and follow-up with timely help desk reaction to users calls for assistance.

**(6) ADS generated error messages must be informative to the users.**

Recommendation: IRMD must work with CBA and the system developers to evaluate existing system error messages and change to a form more user friendly. Currently, many ADS error messages are not intelligible to the average user. Error messages require review and improvements based on continued system use.

**(7) There needs to be easier mechanisms to share report information between clinics.**

Recommendation: IRMD should work with CBA, and HA/Services to place proven quality ADS report generation samples/instructions and potential uses on the ADS home page. Information output from ADS is critical for its appropriate uses. Reports already proven effective at one MTF may also be of benefit at another. HA and Service web clinics dedicated to ADS need to include samples of and instructions for these reports, and provide the capability for the MTFs to download them directly.

**(8) ADS clinic super-users need to know how to receive support.**

Recommendation: IRMD should provide and train users with adequate and timely processes for system problem resolution. Names of points of contact along with telephone numbers will make it easier for clinics to contact the appropriate person for problem resolution.

**(9) Training is needed to run and use the data contained in ADS standard reports.**

Recommendation: HA/Services should provide training on the production and use of both system standard and ad hoc reports. Complaints were heard about the difficulty users were having in obtaining both system standard and ad hoc reports. Only limited training has been provided to many clinic users.

**(10) Follow-on training needs to be provided to clinic users.**

Recommendation: IRMD needs to develop an ADS follow-on user-training program.

**(11) Basic Microsoft Windows literacy on the part of clinic users cannot be assumed.**

Recommendation: IRMD should survey its clinic ADS users to ensure computer literacy and provide training when necessary. Not all clinic users are computer literate. ADS training is degraded or useless without some basic understanding of PC operations.

**(12) Training must be appropriate to audience, i.e., clinical vs. administrative staffs.**

Recommendation: ADS training programs need to be tailored to its intended audience. In this manner, training time can be optimized and student frustrations minimized.

**(13) ADS Training manuals are required.**

Recommendation: IRMD should contact CBA to investigate the possibility of receiving ADS user manuals. These manuals could be specifically designed for IRDM and the ADS operation and maintenance and others that are designed for the users as an operational manual

**G. Data Capture:**

**(1) Clinic Third Party Collection (TPC) policies should be improved.**

Recommendation: Each clinic's Third Party Collection policies should be improved to include better front desk and ADS user SOPs. By ensuring that TPC is part of the initial ADS/check-in process should garner greater collections. This recommendation will require TPC and clinic administration coordination to initiate the process. Department head and director support is essential for ultimate success.

**(2) Changing business practices to reduce walk-ins will improve patient service and facilitate ADS use.**

Recommendation: Clinics should evaluate clinic business practice in support of patient care delivery and ADS use. Although initially driven by systems issues, policies for both walk-in (even to specialty clinics) and sick call patients, and for the capture of telephone consultations need to be carefully reviewed from the perspective of clinic business processes to improve patient service and clinical practice. The business practice of placing ALL patient visits into the

Ambulatory Data System: A Case Study-NHCL  
CHCS as they occur ensures both proper CHCS visit counts, a smoother transition of data to ADS, and therefore a smoother ADS user process.

**(3) There is a need for ADS end-of-day processing between the CHCS and ADS.**

Recommendation: Clinic ADS users should develop some type of end-of-day process that would compare CHCS data with ADS data. A link between the two data fields is essential to data quality and accuracy. ADS data could ultimately be the data that NHCL's resources are funded. According to the SG's SATR report (CHCS vs. ADS) this data is very inaccurate.

**(4) Contingencies for system down time need to be improved and disseminated.**

Recommendation: IRMD needs an improved contingency operations plan. As with all automation systems, a plan for data capture should be prepared for instances where ADS is temporarily inoperable. Overlays, as "sample" forms, could still be used to capture the data. A plan will also be required separately for an alternate electronic front end as an overlay replacement system.

**(5) A process for accounting for completed ADS forms is needed.**

Recommendation: A method for ADS form accountability should be developed. ADS encounter forms should be carefully tracked at least until the encounter is considered complete on the ADS database. Even the encounter itself could be more readily identified by some sort of "register number". Such a tracking mechanism would assist in specific encounter searches for both clinical and administrative support purposes.

**(6) ADS needs to be able to better support the APV data capture and coding process.**



Recommendation: ADS should be better capable of supporting APV coding, including device placement in ambulatory procedure units APUs and inpatient coding sections of NHCL. IRMD needs to confer with CBA for improvements. The ADS data associated with APUs is very inaccurate.

**(7) Clinic ADS overlay templates need to be tailored/flexible/controlled.**

Recommendation: Patient administration (Terry Nogast) should assist each clinic in developing ADS overlay templates that are tailored to that specific clinic. These templates will allow for better data integrity, optimize the efficiency and effectiveness of system use, and provide additional provider and clinic staff flexibility. A centralized control process would be effective, through patient administration's knowledge of coding procedures, and a parallel operational experience with the use of the CHCS PAS and MCP modules.

**(8) The scanning process needs reviewing.**

Recommendation: NHCL need to ensure positive control of the scanning process, to include equipment placement and staffing, whether in a centralized or decentralized mode. Unnecessary errors at this step cause work backlogs in the entire data collection process. Clinic ADS users performing the scanning process must be held accountable by their supervisors for their work performance. They must have been properly trained in both forms scanning procedures and scanner hardware user maintenance.

**(9) ADS reduces time for patient care.**

Recommendation All recommendations under this data capture section, will assist in optimization of time for patient care and ADS use. Clinical processes should be analyzed to determine workflow linkages. Additionally, workflow process integrity between ADS and

Ambulatory Data System: A Case Study-NHCL

CHCS should be evaluated, e.g., the generation of walk-in and telephone consult forms, an end-of-day processing.

#### **H. Data Use:**

##### **(1) Purpose for the use of ADS must be clearly established.**

Recommendation: The HA policy for the purpose and use of ADS should be published. All of the clinics visited indicated their concerns regarding the real purposes and intended uses of ADS data. Some thought it was intended solely for the administrative management of TRICARE contracts, while others believed and sometimes feared that it was a workload tool for the Navy and HA decision makers for dollar and personnel resources. Proper policy statements will educate users for system intentions and uses, as well as dispel unfounded anxiety.

##### **(2) There needs to be a mechanism to provide users with feedback on the appropriate uses of data.**

Recommendation: The ADS Issues team needs to provide proven quality report generation samples/instructions and potential uses on the NHCL home page. Information output from ADS is critical for its appropriate uses. Reports already proven effective at one MTF may also be of benefit at another.

##### **(3) System reports value to the clinical staff needs to be stressed.**

Recommendation: Clinical colleagues should provide clinical staff familiarization to ADS reporting capabilities and data use. At the clinics most successful in ADS compliance, senior

Ambulatory Data System: A Case Study-NHCL  
clinicians had informed their colleagues of the process to obtain data from system reports and the significance of that data. This greatly enhanced clinical staff understanding of system uses and benefits.

**(4) NHCL should continue to publicize the percentage of each clinic's utilization and compliance of ADS.**

Recommendation: Managed Care (Mrs. Higgs) should continue to publish ADS information, i.e., compliance rates; however, the report format should be improved. Currently, this information is published on CHCS e-mail. Recommend a clinic specific report be generated and sent to each director to be discussed with every department head. These practices could engendered friendly competition between clinics for ADS compliance and foster an ownership of the system and the information available from it.

**(5) System ad hoc report training is needed.**

Recommendation: Managed Care (Mrs. Higgs) should provide training on the production and use of both system standard and ad hoc reports. Complaints were heard about the difficulty users were having in obtaining both system standard and ad hoc reports. Training had not been provided to many clinic users. Mrs. Higgs has been trained in Business Objects software associated with it to perform ad hoc reports in a more user-friendly fashion. Training requirements need to be reassessed and accomplished at both the centralized ADS classes, and during sustainment training.

**I. Data Accuracy/Integrity:**

**(1) ADS utilization metric purpose and calculation algorithm must be clearly explained.**

Recommendation: The purpose, use, and calculation methodology of the ADS Utilization Metric should be explained to both clinical and administrative staffs.

**(2) Data Quality must be a focus.**

Recommendation: The ADS Issues team should establish clinic specific multidisciplinary data quality groups. Clinic administrative staff, IRMD, and clinical staff representatives should be included in this effort. The purpose of these clinic groups would be to continually assess the quality, accuracy, and derived uses of ADS data collection at the clinic level, even after ads implementation is complete.

**(3) Data quality edit checks are needed.**

Recommendation: Patient Administration (Ms. Nogast) should work to achieve a deeper level of coding edits that currently exist. This edit would help ensure that diagnostic and procedure codes, together as a set, are as clinically accurate as possible. This will not only strengthen ADS data integrity, but also lends more accurate data support to the third party collection process and utilization management.

**J. Coding:**

**(1) There is a need to be able to use additional coding information to depict actual care provided.**

Recommendation: Users have indicated their desire to be authorized to utilize “E” codes (for use by occupational health, primary care, and emergency rooms). Current DoD policy does not include these in record coding use. Many users desire that DoD emulate civilian practice in coding policies and procedures. This is to provide a greater range and accuracy of coding methodology. It would also provide for greater consistency when comparing case loads between

Ambulatory Data System: A Case Study-NHCL  
contractors and NHCL in TRICARE contract management. HA would have to be involved in any coding changes.

**(2) Coding assistance is needed at the MTF level/Clinics need guidance on which encounters to code.**

Recommendation: HA telephone consult policy needs to be clarified. Telephone Consults are clinical data that can be captured by ADS and may be important in patient care management.

The ADS to CHCS interaction to produce the bubble form is cumbersome, and has led some to discussion that telephone consults are not worth the added effort to capture on ADS. The need to capture accurate immunization data must also be clarified. Currently, immunizations are captured to a varying degree on ADS by the clinics.

**(3) Coding training for clinicians and ADS users is needed.**

Recommendation: NHCL should provide clinician coding training specific to their specialties.

Some clinicians desire coding training from their specialty peers, not from administrators, or clinicians not of their own specialty. While clinician-coding training is a necessity, this recommendation will have to be tempered with cost and other resource considerations.

**(4) The system should allow for the capture of multiple procedure codes.**

Recommendation: ADS should allow for the capture of multiple procedure codes, i.e., the ability to capture the same code more than once on the same record, and include the use of modifiers.

ADS currently will not allow a procedure code to be entered twice for the same encounter. This

can be contrary to actual clinical practice. This would require a policy change and system software modification.

**K. Challenges/Barriers:**

Recommendation All recommendations under categories A through K will assist in optimization of time, efficient use of resources and establishing processes for ADS use and compliance, thus addressing the Challenges and Barriers listed in the results section.

Ambulatory Data System: A Case Study-NHCL  
**CHAPTER 6**

**Conclusion**

The literature reviewed showed that in a rapidly changing health care environment, data is driving more and more health care industry decision making. This is supported by the increasing initiatives focused on the capture of outcome data, such as the: Joint Commission on Accreditation of Health care Organization's ORYX; proposed home health data set known as Outcomes and Assessment Information Set (OASIS); Minimum Data Set (MDS) for long term care; National Committee for Quality Assurance's (NCQA), and the Health Plan Employer Data and Information Set (HEDIS) (JCAHO, 1997). This data will be used within facilities to monitor performance improvement efforts and to improve outcomes. In addition, it will be used comparatively among facilities as benchmarks.

ADS compliance and reporting accurate health care data presents a tremendous challenge to NHCL. The use of ADS represents a significant change in established business and clinical practices. Further, it is evident that multiple barriers and challenges to ADS full compliance are present throughout the organization. These barriers and challenges must be met head on. Influential groups of individuals throughout the organization have to be brought into the ADS process and must be convinced of its importance on the future of NHCL. The usage, necessity, validity, and utility of ADS must be expressed, trained, understood, and performed. Finally, hospital personnel must understand and use the data generated by ADS are realize that future decision-makers are going to make decisions based on this data that will effect NHCL.

The purpose of this case study was to analyze the NHCL ADS process, determine the factors preventing 100% ADS compliance, and present recommendations. This case study does

Ambulatory Data System: A Case Study-NHCL  
examine the process, begin to shed light on compliance issues, and offers solid recommendations for future ADS compliance.

At minimum, NHCL must take the following steps: 1) educate the organization on ADS uses and benefits; 2) identify and implement proper ADS processes; 3) improve ADS/third party collection processes; 4) evaluate ADS system support, hardware, and network capabilities; 5) analyze and remove ADS barriers and challenges; 6) verify staffing with regard to ADS usage; and 6) make ADS a command priority.

As stated earlier, this study is just the starting point or foundation to a new beginning for ADS accuracy and compliance for NHCL.



**AMBULATORY DATA SYSTEM (ADS)  
CASE STUDY-INTERVIEW SHEET**

**CLINIC:**\_\_\_\_\_ **COMPLIANCE (%):**\_\_\_\_\_  
**DEPARTMENT HEAD:**\_\_\_\_\_  
**ADS SUPER-USER:**\_\_\_\_\_ **TRAINED:**\_\_\_\_ **YES**\_\_\_\_ **NO**\_\_\_\_  
**SECONDARY-USER:**\_\_\_\_\_ **TRAINED:**\_\_\_\_ **YES**\_\_\_\_ **NO**\_\_\_\_

**ADS STUDY AREAS:**

- (1) Leadership - includes the formal direction from the upper levels of the organization to those responsible for administering ADS. This category also includes internal marketing, encouragement, command emphasis, the establishment and support of project management teams, system compliance, and process guidance:

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- (2) Staffing - all aspects of personnel staffing that affect ADS implementation, operation, compliance, and maintenance:

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**AMBULATORY DATA SYSTEM (ADS)**  
**CASE STUDY-INTERVIEW SHEET**

**ADS STUDY AREAS:**

- (3) System Performance - all issues related to performance, reliability, and availability of ADS to the end users:

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- (4) System Management - all issues related to system administration and support:

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- (5) System Hardware - hardware failures, configuration, and device placement:

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**AMBULATORY DATA SYSTEM (ADS)**  
**CASE STUDY-INTERVIEW SHEET**

**ADS STUDY AREAS:**

- (6) Support - providing information, training, and user assistance to all categories of personnel involved with the system:

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- (7) Data Capture - includes all issues relative to the capture of ambulatory encounter data in the database from a functional process perspective:

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- (8) Data Use - all issues related to report generation and data availability for other uses such as third party collections:

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**AMBULATORY DATA SYSTEM (ADS)  
CASE STUDY-INTERVIEW SHEET**

**ADS STUDY AREAS:**

- (9) Data Accuracy/Integrity – all issues relating to data accuracy, specifically the comparison of ADS to CHCS data:

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- (10) Coding - all issues relating to ADS coding of the bubble-sheets:

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Ambulatory Data System: A Case Study-NHCL

- (11) Challenges/Barriers - all other issues that may not fit into the above categories, including the primary reasons for the individual clinic's inability or ability to achieve 100% ADS compliance:

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## APPENDIX B: ADS RECOMMENDATION SUMMARY

**NOTE:** \*Many ADS problems entail additional individual clinic planning and modification in order to develop some type of resolution.

\*Some ADS system and compliance problems are unable to be fixed at the MTF level; therefore, the Office of the Assistant Secretary of Defense, Health Affairs ((OASD(HA)) and the Clinical Business Area (CBA), Washington, D.C will have to be informed in order to enact recommendations.

\*Each recommendation category corresponds with an associated result category listed in the results section of this study.

<u>ADS Issues &amp; Recommendations:</u>		<u>Action Party</u>
<b>A. Leadership:</b>		
1. Senior level management support should be included in ADS operations & compliance measures.		ESC & Dept.Heads
2. Clinic Standard Operating Procedures (SOPs) for ADS process must be established.		Super-users, IRMD, Third Party Collections, Pt. Admin.(coding)
3. Clinical interfaces and stakeholders delegations must be defined.		ADS Issues Team
4. Command support of the multidisciplinary ADS Issues team is essential.		ESC & Dept.Heads
5. Establish an NHCL Annual Plan goal covering ADS operation and compliance measures.		ESC
<b>B. Staffing:</b>		
1. Clinics need personnel expertise to employ staff effectively.		Personnel Dept. & Position Mgmt. Comm.
2. ADS operations must be prioritized to consider other clinic activities.		Directors, Dept.Heads
3. Additional resources for ADS administration and IRMD systems administration needed.		ESC, Fiscal, HA
<b>C. System Performance:</b>		
1. IRMD needs additional system parameter adjustments training.		IRMD, CBA

<u>ADS Issues &amp; Recommendations:</u>		<u>Action Party</u>
<b>C. System Performance (cont.):</b>		
2. ADS System problems need to be addressed by IRMD.		IRMD, CBA
3. Systems "reboot" problems must be addressed to CBA.		IRMD, CBA
<b>D. System Management:</b>		
1. ADS Maintenance of system user files is required.		IRMD, CBA
2. ADS System review of event patterns, key issuance, and logging requirements is needed.		IRMD, CBA, HA
<b>E. Hardware:</b>		
1. Additional ADS user devices are needed.		ESC, Fiscal, HA
2. End user device placement should be evaluated.		IRMD, CBA
3. Evaluate hardware maintenance support.		IRMD, CBA
4. Network mini-hub failures need to be discussed with CBA.		IRMD, CBA
5. Scanner alignment and sensitivity problems need to be addressed.		IRMD
6. Printer jams are common and need to be addressed.		IRMD
<b>F. Support:</b>		
1. ADS support needs to be increased.		ESC, DH, IRMD
2. ADS overlay maintenance support needs improvement.		Terry Nogast
3. IRMD help desk & training needs to be improved and standardized		IRMD
4. ADS problem resolution process must be understood by users; responsiveness to user problems is inadequate.		Users, IRMD

APPENDIX B

<u>ADS Issues &amp; Recommendations:</u>		<u>Action Party</u>
<b>F. Support (cont.):</b>		
5. ADS generated error messages must be informative to the users.		IRMD, CBA
6. There needs to be easier mechanisms to share report information between clinics.		ADS Issues Team
7. ADS clinic super-users need to know how to receive support.		IRMD, ADS Issues Team
8. Training is needed to run and use the data contained in ADS standard reports.		IRMD
9. Follow-on training needs to be provided to clinic users.		IRMD
10. Basic Microsoft Windows literacy on the part of clinic users cannot be assumed.		IRMD
11. Training must be appropriate to audience, i.e., clinical vs. administrative staffs.		IRMD
12. ADS Training manuals are required.		IRMD, CBA
<b>G. Data Capture:</b>		
1. Clinic Third Party Collection (TPC) policies should be improved.		Clinics, Cheryl Haynes
2. Business practices to reduce walk-ins should be improved.		ESC, Clinics
3. There is a need for ADS end-of-day processing between the CHCS and ADS.		ARMD, Clinics
4. Contingencies for system down time need to be improved and disseminated.		IRMD
5. A process for accounting for completed ADS forms is needed.		Clinics, ADS Issues Team
6. ADS needs to be able to better support the APV data capture and coding process.		ADS Issues Team
7. Clinic ADS overlay templates need to be tailored/flexible/controlled.		Terry Nogast
8. The scanning process, including responsible personnel and scanner location, needs reviewed.		IRMD
		APPENDIX B



**ADS Issues & Recommendations:**

**Action Party**

**H. Data Use:**

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|--|--------------------------------|
| 1. Purpose for the use of ADS must be clearly established.   | HA, ESC, DH<br>ADS Issues Team |
| 2. There needs to be a mechanism to provide users with feedback on the appropriate uses of data.         | ADS Issues Team                |
| 3. System reports value to the clinical staff needs to be stressed.                                      | Dana Higgs                     |
| 4. NHCL should continue to publicized the percentage of each clinic's utilization and compliance of ADS. | Dana Higgs                     |
| 5. System ad hoc report training is needed.  | Dana Higgs                     |

**I. Challenges/Barriers:**

All recommendations under categories A through K will assist in optimization of time, efficient use of resources and establishing processes for ADS use and compliance, thus addressing the Challenges and Barriers listed in the results section.

**J. Data Accuracy/Integrity:**

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|--|-----------------|
| 1. ADS utilization metric purpose and calculation algorithm must be clearly explained. | Dana Higgs      |
| 2. Data quality must be a focus.   | ADS Issues Team |
| 3. Data quality edit checks are needed.  | ADS Issues Team |

**K. Coding:**

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|--|------------------------|
| 1. There is a need to be able to use additional coding information to depict actual care provided. | Terry Nogast, TAD (\$) |
| 2. Coding assistance is needed at the MTF level/Clinics need guidance on which encounters to code. | Terry Nogast, TAD (\$) |
| 3. Coding training for clinicians and ADS users is needed.   | Terry Nogast, TAD (\$) |
| 4. The system should allow for the capture of multiple procedure codes.                            | Terry Nogast, TAD (\$) |

APPENDIX B

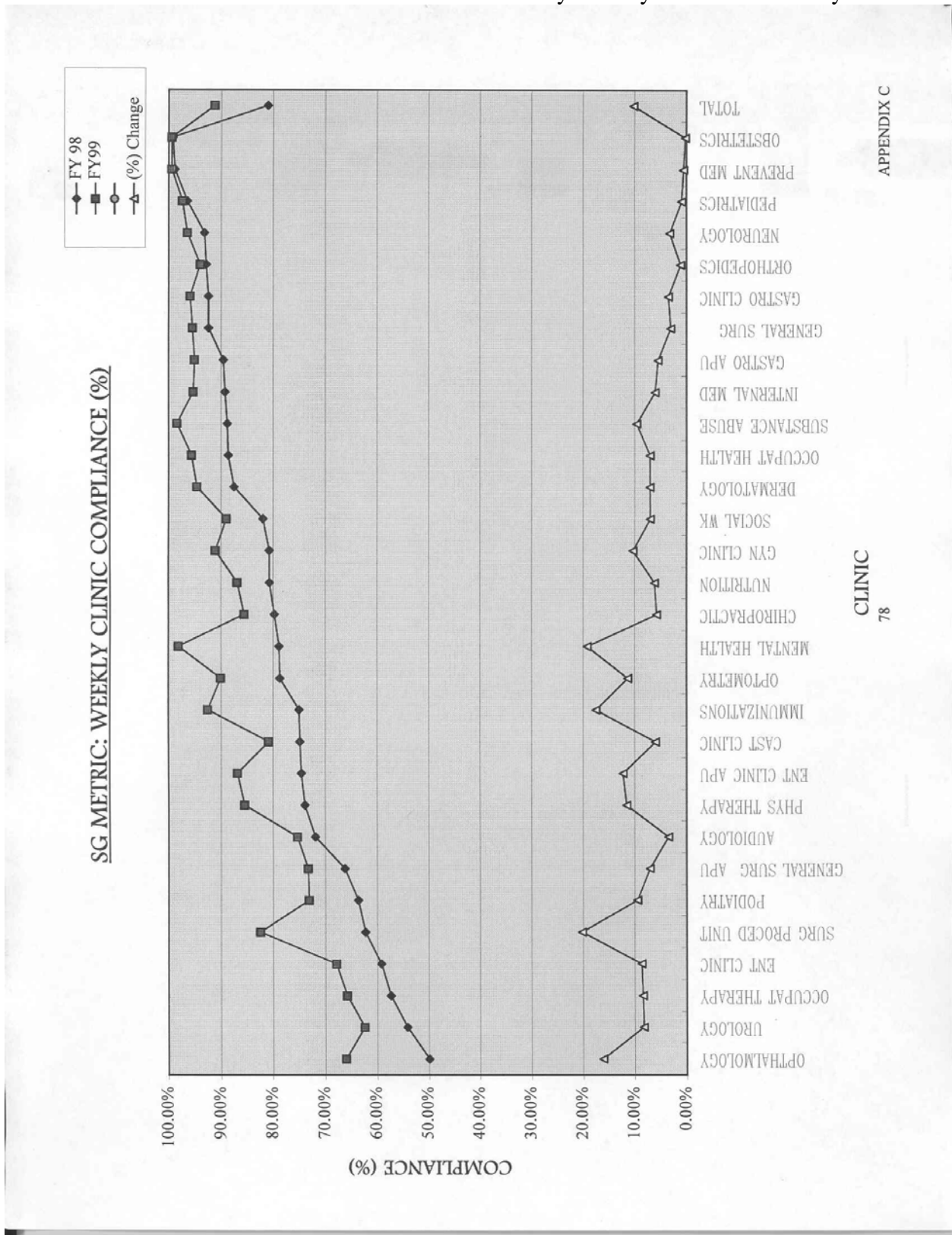
ADS Issues & Recommendations:

Action Party

5. Every clinic needs coding access ie. current code books, CD ROMS.  
Suggest purchasing network coding software to be placed on NHCL's intranet

ESC, IRMD

Surgeon Generals Compliance Statistics																
	Average Weekly Compliance %s						Average Weekly Compliance %s						Percentage (%)			
	October 1, 1997-September 30, 1998						October 1, 1998-March 31, 1999									
	C	I	Q	U	T	FY 98	C	I	Q	U	T	FY99				
HOSP. CLINIC	2,213	1,062	1,156	4	4,435	49.90%	1,328	336	345	2	2,011	66.02%	16.12%			
OPHTHALMOLOGY	1,462	389	850	0	2,701	54.13%	977	133	455	0	1,565	62.43%	8.30%			
UROLOGY	2,207	40	1,600	0	3,847	57.37%	1,525	24	768	0	2,317	65.82%	8.45%			
OCCUPAT THERAPY	4,083	1,253	1,559	0	6,895	59.22%	2,789	752	567	0	4,108	67.90%	8.68%			
ENT CLINIC	1,911	0	492	665	3,068	62.29%	2,356	0	102	399	2,857	82.46%	20.18%			
SURG PROCED UNIT	1,899	328	756	0	2,983	63.66%	1,467	197	342	0	2,006	73.14%	9.48%			
PODIATRY	1,559	105	667	23	2,354	66.23%	1,122	63	332	14	1,531	73.30%	7.07%			
GENERAL SURG APU	1,386	208	334	0	1,928	71.89%	987	125	198	0	1,310	75.36%	3.47%			
AUDIOLOGY	12,917	1,379	2,838	344	17,478	73.90%	8,902	827	479	206	10,415	85.47%	11.57%			
PHYS THERAPY	47	6	8	2	63	74.60%	45	4	2	1	52	86.87%	12.27%			
ENT CLINIC APU	1,141	37	345	1	1,524	74.87%	887	22	187	1	1,097	80.87%	6.00%			
CAST CLINIC	66,222	0	22,000	0	88,222	75.06%	56,890	0	4,567	0	61,457	92.57%	17.51%			
IMMUNIZATIONS	2,756	119	620	4	3,499	78.77%	1,654	34	145	2	1,835	90.11%	11.35%			
OPTOMETRY	4,567	0	1,222	0	5,789	78.89%	1,740	0	34	0	1,774	98.08%	19.19%			
MENTAL HEALTH	8,019	802	1,219	9	10,049	79.80%	5,455	481	434	5	6,376	85.56%	5.76%			
CHIROPRACTIC	988	1	233	2	1,224	80.72%	655	1	97	1	754	86.89%	6.17%			
NUTRITION	6,587	0	1,567	1	8,155	80.77%	4,678	0	456	1	5,135	91.11%	10.33%			
GYN CLINIC	1,207	42	223	0	1,472	82.00%	834	25	78	0	937	88.99%	6.99%			
DERMATOLOGY	5,672	107	696	6	6,481	87.52%	4,408	34	214	4	4,660	94.60%	7.08%			
OCCUPAT HEALTH	4,678	256	345	0	5,279	88.62%	3,877	54	122	1	4,054	95.63%	7.02%			
SUBSTANCE ABUSE	5,203	86	568	1	5,858	88.82%	5,433	52	34	1	5,519	98.44%	9.62%			
INTERNAL MED	5,669	17	657	10	6,353	89.23%	3,901	10	176	6	4,093	95.30%	6.07%			
GASTRO APU	206	5	19	0	230	89.57%	276	3	11	0	290	95.04%	5.48%			
GENERAL SURG	5,755	18	455	1	6,229	92.39%	3,789	11	169	1	3,969	95.46%	3.06%			
GASTRO CLINIC	744	3	56	2	805	92.42%	587	2	22	1	612	95.92%	3.49%			
ORTHOPEDECS	13,876	588	479	0	14,943	92.86%	9,234	353	234	0	9,821	94.02%	1.17%			
NEUROLOGY	1,864	4	131	1	2,000	93.20%	1,567	2	55	1	1,625	96.43%	3.23%			
PEDIATRICS	21,980	27	778	3	22,788	96.45%	14,334	16	365	2	14,717	97.40%	0.94%			
PREVENT MED	3,982	19	28	1	4,030	98.81%	2,657	5	11	1	2,674	99.38%	0.57%			
OBSTETRICS	23,117	0	185	2	23,304	99.20%	14,567	0	87	1	14,655	99.40%	0.20%			
TOTAL	213,917	6,901	42,086	1,082	263,986	81.03%	158,920	3,565	11,088	650	174,224	91.22%	10.18%			



Ambulatory Data System: A Case Study-NHCL  
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